REMARKS

This communication is filed in response to the Office Action dated November 26, 2010. Claims 1, 2, 10-15, 17, 18, and 23 are amended for clarity and to advance prosecution. Claims 3-6, 8, 9, 16, and 19-22 are presently canceled. Claim 9 was previously canceled. Claim 24 is added. Accordingly, claims 1, 2, 7, 10-15, 17, 18, 23, and 24 are pending in this application.

Claim Objections

Claims 10 and 15 were objected to as containing informalities based on the term "forth." *Office Action* at 2. By virtue of the present amendments, this term is replaced with the term "fourth" in claim 10 and is removed from claim 15. As such, Applicants submit that the objection is moot and request that it be withdrawn.

The Rejection of Claims Under § 101

Claims 10-15 were rejected under 35 U.S.C. 101 as allegedly being directed to non-statutory subject matter. *Office Action* at 2. Claim 10 is amended to depend from claim 1, which is not rejected under 35 U.S.C. §101. Applicants respectfully submit that, as amended herein, claim 10 does encompass statutory subject matter. Thus, Applicants respectfully request that this rejection be reconsidered and withdrawn. Claims 11-15 depend from claim 10 and are merely amended for consistency with the claims from which they depend. As such, claims 11-15 are also directed to patentable subject matter.

Claims 17-23 were rejected as allegedly being directed to non-statutory subject matter. *Office Action* at 2 *et seq.* As amended, independent claim 17 recites, *inter alia*, "one or more processors." The presence of the one or more processors effectively ties the claim to a particular machine. *See Interim Examination Instructions for Evaluating Subject Matter Eligibility Under 35 U.S.C. §101* (August 25, 2009) at slide 15. Therefore, Applicants assert that independent claim 17 is directed to statutory subject matter. Claims 18-23 depend from claim 17 and are, therefore, directed to statutory subject matter for at least the same reasons as claim 17.

The Rejection of Claims Under § 103

Claims 1-8 and 10-23 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Ming-Chuan Wu, "Encoded Bitmap Indexes and Their Use for Data Warehouse Optimization," D17, Darmstadt Dissertation, January 2001 (*Wu*). Claims 3-6, 16, and 19-22 are canceled, rendering the rejection of those claims moot. Applicants respectfully traverse the rejections of the pending claims.

The recent U.S. Supreme Court decision of *KSR v. Teleflex* provides a tripartite test to evaluate obviousness:

> The rationale to support a conclusion that a claim would have been obvious is that all the claimed elements were known in the prior art and ***one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions,*** and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art. (*See KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 82 U.S.P.Q.2d 1385 (2007); *see also* MPEP § 2143, emphasis added.)

Applicant will show that the cited references, either singly or in combination, do not teach or suggest all limitations of Applicant's claimed elements, with no change in the respective functions of the cited references, nor is there any substantiating evidence that the combination of the references would have yielded nothing more than predictable results. "If ***any of these [three] findings*** cannot be made, then this rationale [of combining prior art elements according to known methods to yield predictable results] cannot be used to support a conclusion that the claim would have been obvious." MPEP § 2143, emphasis added.

Claim 1, as amended, recites in part "the first parameter and the second parameter influencing the performance of a software application with regards to a specific task." In the *Office Action*, the Examiner asserts that (quoted claim language underlined):

> [A]t least one parameter (e.g. *bitmap index, attributes, cust_id, nation_id, orders_id* - Fig. 4.3; grouping attributes, dimension tables - pg. 89-90; *result set, group-set bitmap index* - pg. 92; *set of orders_id* - pg. 93; group set Fig. 4.12, Fig. 4.14 pg. 108-110; response time, e - pg. 114; sec 4.21; Algorithm 4 pg. 97; Algorithm 7, pg. 111; $0< e < 0.5$, significance threshold - pg. 115; hits - pg. 125-126) influencing the performance of a software application (*query processing, performance* - sec 4.1, pg. 85; Fig. 4.1, 4.2, Fig.

> 86-87) with regards to a specific task (Selections, Group bys, Aggregations Order bys - pg. 86 top; sec 4.3.1 pg. 105-120; Aggregation, Algorithm 8 pg. 112; limited buffer I ≤ w, Algorithm 7 pg. 111); *Office Action* at 4-5 (italics in original)(underlining added).

Here, the Examiner has divided a single element into three discrete elements, and cited to various terms appearing in *Wu* over a span of 25 pages. The Examiner has not provided any additional context as to how these terms fit together to disclose the element. The Examiner relies merely on idiomatic terms. Applicants submit that the Examiner's reliance on the idiomatic is highly suggestive that the Examiner is using Applicants' structure as a template and selecting individual elements from various portions of *Wu* in a hindsight reconstruction of Applicants' claimed invention. Further, the division of the single element into three discrete elements suggests that the Examiner is merely considering whether the differences are obvious, not whether the invention as a whole is obvious. The U.S. Supreme Court has held that USPTO personnel may not dissect a claimed invention into discrete elements and then evaluate the elements in isolation. Instead, the claim as a whole must be considered. *See, e.g.*, *Diamond v. Diehr*, 450 U.S. 175, 188-89, 209 USPQ 1, 9 (1981).When considered as a whole, Applicant's claimed elements are neither taught nor suggested by any combination of the cited references.

Applicants aver that the parameters cited by the Examiner are not parameters that "influenc[e] the performance of a software application with regard to a specific task" As recited by Applicants' claim 1. Instead, the parameters of *Wu* may be used in a search query to perform a look-up in a bitmap index. To illustrate, Fig. 4.3 of *Wu*, cited by the Examiner, is reproduced below:

customers

cust_id	mktsegment	nation_id	...
C00001	BUILDING	01	
C00002	AUTOMOBILE	02	
C00003	AUTOMOBILE	03	
C00005	HOUSEHOLD	02	
C00007	AUTOMOBILE	03	
C00009	FURNITURE	02	
C00013	BUILDING	03	
C00014	FURNITURE	02	
...	...	...	

(a) Snapshot of the dimension table **customers**

orders

orders_id	cust_id	priority	...
000032	C00014	HIGH	
000102	C00001	HIGH	
000161	C00002	HIGH	
000196	C00007	HIGH	
000199	C00007	HIGH	
000226	C00013	HIGH	
000263	C00013	HIGH	
000295	C00002	HIGH	
000320	C00001	HIGH	
000354	C00014	HIGH	
000357	C00007	HIGH	
000358	C00001	HIGH	
000386	C00007	HIGH	
000389	C00013	HIGH	
000391	C00013	HIGH	
000513	C00007	HIGH	
000516	C00005	HIGH	
000518	C00014	HIGH	
000545	C00007	HIGH	
000546	C00014	HIGH	
000579	C00007	HIGH	
000580	C00007	HIGH	
...	...	...	

lineitems

...	order_id	qty	...	b_A	b_B	b_F	b_H
	000032	464		0	0	1	0
	000102	444		0	1	0	0
	000161	76		1	0	0	0
	000196	136		1	0	0	0
	000199	320		1	0	0	0
	000226	776		0	1	0	0
	000263	265		0	1	0	0
	000295	267		1	0	0	0
	000320	129		0	1	0	0
	000354	489		0	0	1	0
	000357	282		1	0	0	0
	000358	669		0	1	0	0
	000386	276		1	0	0	0
	000389	6		0	1	0	0
	000391	42		0	1	0	0
	000513	192		1	0	0	0
	000516	33		0	0	0	1
	000518	642		0	0	1	0
	000545	66		1	0	0	0
	000546	48		0	0	1	0
	000579	384		1	0	0	0
	000580	249		1	0	0	0
	...	...					

$\mathbb{B}^{mktsegment}$

(b) Snapshots of the dimension table **orders** and the fact table **lineitems**; b_A is the group-set bitmap for the group AUTOMOBILE, b_B for BUILDING, b_F for FURNITURE, b_H for HOUSEHOLD

Figure 4.3: Group-set bitmap index

For example, the cust_id attribute cited by the Examiner is merely a column label in a list of customer identifiers. There is no indication that changing the "cust_ID" of a particular customer would affect the query processing tasks of *Wu*. As such, *Wu* does not disclose "the first parameter and the second parameter influencing the performance of a software application with regards to a specific task" as recited in Applicants' claim 1.

Further, the haphazard citations to various portions over 25 pages of chapter 4 of *Wu* is highly suggestive that the Examiner is using Applicants' structure as a template and selecting

individual elements from the reference in a hindsight reconstruction of Applicants' claimed invention. Further, the use of individual terms from *Wu* suggests that the Examiner is merely considering whether the differences are obvious, not whether the invention as a whole is obvious. The U.S. Supreme Court has held that USPTO personnel may not dissect a claimed invention into discrete elements and then evaluate the elements in isolation. Instead, the claim as a whole must be considered. *See, e.g.*, *Diamond v. Diehr*, 450 U.S. 175, 188-89 (1981). For example, in the present case, the Examiner has disregarded the relationship between the "first parameter and the second parameter" and "the performance of the software application." In determining the differences between the prior art and the claims, the question under 35 U.S.C. §103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*, 713 F.2d 782 (Fed. Cir. 1983). Clearly, the Examiner is evaluating elements in isolation and not considering the claim as a whole. When considered as a whole, Applicants' claimed elements are neither taught nor suggested by any combination of the cited references.

Next, claim 1, as amended, recites in part "the first threshold value separating a first value range of the first parameter into two intervals of a first dimension." In support of the rejections of now-canceled claim 3 that included similar elements as just recited, the Examiner noted, "(Algorithm 9: s, *t, r, e* - pg. 115-116 Note: threshold included in inequality expression to represent a partitioning requirement reads on two intervals of first dimension - e.g. estimate cost *r,* s, *t).*" *Office Action* at 5. Applicants submit that the variables *r*, *s*, and *t* of *Wu* represent an amount of time. While time is just one example of a dimension, *Wu* does not teach or suggest "the first threshold value separating a first value range of the first parameter into two intervals." Instead, Figure 4.18 of *Wu* depicts subcases that are contemplated within Algorithm 9 cited by the Examiner:

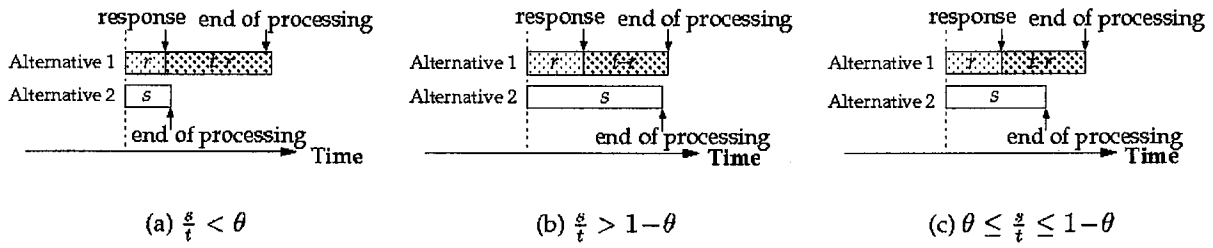


Figure 4.18: Three sub-cases, where $r < s < t$

As depicted, the lengths of time of *Wu* are compared to one another using the quotient θ of *s/t*. The quotient does not separate the dimension, time, into two intervals but merely considers a ratio of the two interval lengths. As such, *Wu* does not teach or suggest this element of claim 1.

Third, claim 1, as amended, recites in part "the second threshold value separating a second value range of the second parameter into at least two intervals of a second dimension." In support of the rejection of now-canceled claim 5 that included similar elements, the Examiner noted:

> ([S]ee C.2 pg. 201-202; sums of the parts, pi[gg]y-backed- pg. 118-119; sec 4.1.2 rewriting the number of groups - Note: reorganize large group into smaller subgroup as pi[gg]y-backed requirements reads on selecting a better response time scenario based on separating upper bound and lower bound of ranges or dimension table or group-set for a complex Aggregation task).

The cited portion of *Wu*, however, refers to aggregating "dimension tables" (*Wu* at Fig. 4.19, page 118) to replace "joins to dimension tables" with "counting on bitmaps and some simple arithmetical calculation" to "shorten the response time," among other benefits. *Wu* at 119. However, it is unclear how aggregating dimension tables is connected to Applicants' claimed elements of "separating upper bound and lower bound of ranges or dimension table or group-set for a complex Aggregation task" as asserted by the Examiner. In fact, the Examiner is using circular logic (aggregating tables to select better response time for aggregating tables) to establish an assertion that is irrelevant to "the second threshold value separating a second value range of the second parameter into at least two intervals of a second dimension" as recited in Applicants' claim 1.

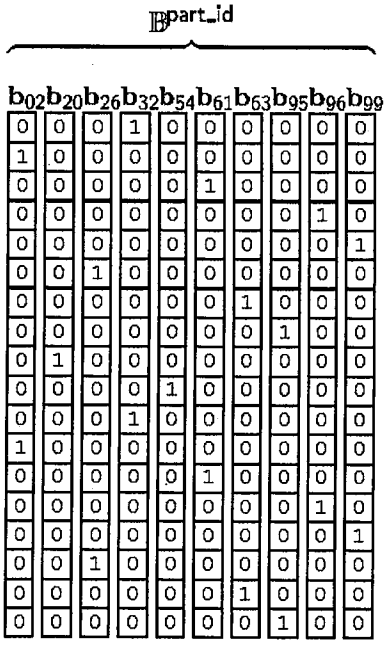
Moreover, Appendix C, as cited by the Examiner is closely related to Figure 4.18, reproduced above. *Office Action* at 5; *Wu* at Figure C.1. Figure 4.18 and Appendix C refer solely to one dimension: time. *Wu* at 202. As such, the portions of *Wu* cited by the Examiner in the rejections of now-canceled claims 3 and 5 do not teach or suggest "the first threshold value separating a first value range of the first parameter into two intervals of a first dimension and the second threshold value separating a second value range of the second parameter into at least two intervals of a second dimension" as recited in Applicants' claim 1.

Fourth, claim 1 further recites, "the selected algorithm assigned to an intersection of the interval of the first dimension that includes the corresponding current parameter value of the first dimension and the interval of the second dimension that includes the corresponding current parameter value of the second dimension." In support of the rejection of now-canceled claim 6 that included similar elements, the Examiner relied on the subranges of Appendix C and on the Aggregation function of pages 118 and 119 of *Wu*. *Office Action*, at 7. The Aggregation function is illustrated in Figure 4.19, reproduced below:

parts

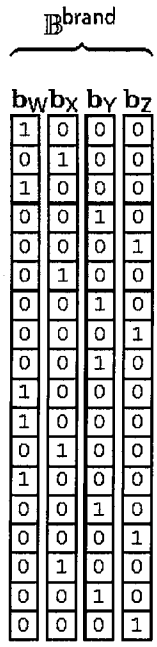
part_id	price	brand	...
P00002	385	X	
P00020	122	Y	
P00026	755	X	
P00032	400	W	
P00054	476	W	
P00061	70	W	
P00063	260	Y	
P00095	260	Z	
P00096	130	Y	
P00099	315	Z	

(a) Snapshot of the dimension table **parts**



lineitems

...	part_id	price	...
	P00032	464	
	P00002	444	
	P00061	76	
	P00096	136	
	P00099	320	
	P00026	776	
	P00063	265	
	P00095	267	
	P00020	129	
	P00054	489	
	P00032	464	
	P00002	444	
	P00061	76	
	P00096	136	
	P00099	320	
	P00026	776	
	P00063	265	
	P00095	267	



(b) Snapshots of the fact table **lineitems** and the bitmap index $\mathbb{B}^{part\_id}$ on **part_id**, the subscripts of the bit vectors stand for the last two digits of the part_id

(c) The group-set bitmaps $\mathbb{B}^{brand}$ on **brand** derived from $\mathbb{B}^{part\_id}$

Figure 4.19: Aggregate on dimension table(s)

As shown, the aggregation function of *Wu* is used to generate bitmap tables from a larger dimension table. The bitmap tables are used to shorten response times. In the rejection of claim 6, the Examiner proposed:

> Based on Wu _ D 17' s selecting of Aggregation alternative by which sub-grouping are used to improve response time and sub-dividing of threshold for finding a better partitioning response as set

> forth above using a overlapping operator, and the overhead cost in performance due to box bounding as set forth above in the overlapped pipelining approach, it would have been obvious for one of ordinary skill in the art ***to implement Wu _ D 17's selection of best alternative so that the subdivision of threshold requirement or regrouping of dimension set to that sub-divided set of range intersect with each other in terms that intersection intervals including portion of the first dimension containing the corresponding current parameter value of the first dimension and portion of the second dimension containing the corresponding current parameter value of the second dimension,*** because overlapping regions or range - as indicated in Wu _ D 17' s overlapping approach - would cover for all the partitions included in a larger range whose upper or lower bound are to be excluded as shown in Wu _ D 17' s readjusting of threshold (see C.2 pg. 201-202) such that all data or parameter values (response time, return of group hits—see pg. 117-119) to be considered within the large range (group-set, dimension table/set) would be all inclusive in the final account and ensuing evaluation of result leading to choosing the best algorithm (e.g. bitmap indexed dynamic Aggregation scenario - see sec 2.1.2 pg. 21) as to improve overhead cost in support of best selection of partition/group as endeavored in Wu _ D 17' s pipelining of operations via overlapping of index intervals from above. *Office Action* at 6-7 (emphasis added).

Applicants, first, are unclear as to how the Examiner proposes both selecting the Aggregation and subdividing a threshold for finding a better partitioning response in such a way as to actually intersect the two concepts. While aggregation may shorten a response time, the aggregation (of Figure 4.19) itself is a preprocessing task that is performed separately from the finding the threshold for a better response time (see, Figure 4.18). In contrast, claim 1, as amended, recites, "the selected algorithm assigned to an intersection of the interval of the first dimension that includes the corresponding current parameter value of the first dimension and the interval of the second dimension that includes the corresponding current parameter value of the second dimension."

More likely, the combination proposed by the Examiner would result in measuring multiple response and query processing times for various aggregation schemes in an attempt to deduce a particular aggregation of the dimension tables that will shorten the response and/or query processing times for certain queries. As such, the combination proposed by the Examiner

does not teach or suggest that "the selected algorithm [is] assigned to an intersection of the interval of the first dimension that includes the corresponding current parameter value of the first dimension and the interval of the second dimension that includes the corresponding current parameter value of the second dimension."

For at least the above reasons, *Wu* does not render claim 1 unpatentable. Independent claim 17 includes at least some limitations similar to those of claim 1 discussed, above. Claims 2, 7, 8, 10-15, 18, and 23 each depend from claim 1 or 17 and are allowable for at least the same reasons. The dependent claims may each be allowable for its own limitations.

CONCLUSION

Applicants respectfully submit that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone the undersigned representative at (408) 278-4051 to facilitate prosecution of this application.

If necessary, please charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

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